5-6-2015

Mediation of Adolescent High-Risk Behaviors: A Curriculum Based Risk Assessment Approach

Daniel Lindenfeld
Winona State University

MEDIATION OF ADOLESCENT HIGH-RISK BEHAVIORS: A CURRICULUM BASED RISK ASSESSMENT APPROACH

Daniel Lindenfeld

A Capstone Project submitted in partial fulfillment of the

Requirements for the Master of Science Degree in

Counselor Education at

Winona State University

Spring 2015

Winona State University

College of Education

Counselor Education Department

CERTIFICATE OF APPROVAL

CAPSTONE PROJECT

Mediation of Adolescent High-Risk Behaviors:

A Curriculum Based Risk Assessment Approach

This is to certify that the Capstone Project of

Daniel Lindenfeld

Has been approved by the faculty advisor and the CDE 695- Capstone Project

Course Instructor in partial fulfillment of the requirements for the

Master of Science Degree in

Counselor Education

Capstone Project Supervisor: [signature] Moore, PhD
Name

Approval Date: 5/6/2015

Abstract

Adolescence is a developmental period associated with higher levels of impulsive and risky behaviors. Contemporary research has generally considered these high-risk behaviors using two prevalent theoretical perspectives. The first views high-risk behavior in terms of the development of the human brain and related cognitive processing, and the second in terms of the how the adolescent experiences and perceives the social and cultural relationships in his or her environment. Both theoretical orientations espouse the view that risky decisions are made in emotionally charged environments, and are usually impulsive and reactive in nature. While national statistics continue to show that the tendency to engage in risk taking behaviors is a normal aspect of adolescent development, these level of harm these risks pose risks may potentially be reduced by employing a deliberate risk deliberation and decision making process. Accordingly, a psycho-educational model for training adolescents in the use of risk assessment procedures prior to engaging in potentially harmful activities (to include driving) is proposed. It is hypothesized that the completion of a risk assessment related in an emotionally neutral time could effectively reduce the propensity for adolescents to engage in impulsive and emotionally charged high-risk behaviors.

Contents

Introduction

The adolescent years are a developmental period characterized by a series of profound and dramatic physical, social, emotional and cognitive changes. Developmental theorists explain these changes as functional in allowing the individual to transition into adulthood and both the independence and responsibilities that come with it. This transition to adulthood and independence brings with it an inherent need to experiment and to try new skills or roles as the personality of an independent adult emerges. The majority of adolescents are able to successfully negotiate this developmental period. However, as young men and women experience higher levels of independence and freedom, they frequently engage in habits and behaviors that carry higher levels of risk and the potential for both immediate and long-term harm.

The popular, cultural and scientific communities have long recognized and acknowledged the presence and detrimental impact of potentially harmful activities in adolescence. The data confirm the level of harm that risk-taking behaviors cause. As indicated by the Centers for Disease Control and Prevention (CDC), unintentional accidents have consistently been the leading cause of teen fatalities in the United States for at least the ten years that were reported in the data used for this paper (Center for Disease Control, 2015). Of these fatalities, the leading cause of death amongst adolescents has consistently been from automobile or other vehicular accidents, particularly for adolescent males, whose fatality prevalence rates are up to three times that of the adult general population (Centers for Disease Control and Prevention, 2015). It is important to acknowledge that a significant amount of these fatalities may not be related to deliberate risk-taking behaviors, but due to the relative lack of experience in driving for adolescents or due to other environmental causes unrelated to the decisions of the teens who died in these accidents. It is also important to note that careless or risk taking behaviors in

adolescence are not restricted to driving related behaviors, but may be additionally seen as young people making choices to use intoxicants, take risks in sports or leisure activities, or engage in situations that could result in sexual assault, the acquisition of a sexual disease or an unintended pregnancy, among others.

The function and mission of this forum is to introduce a curriculum that trains adolescents to use a procedure that identifies and analyzes the risk factors that they may encounter in their planned activities. Within the curriculum, adolescents are taught about the normal development of the human brain, and how this affects their propensity to make decisions that have a higher level of avoidable risk than other age groups. Using this knowledge, it is hoped that adolescents will be able to successfully avoid unnecessary risks by proactively identifying hazards they may encounter and planning alternatives that can reduce the probability and effect of encountering these hazards.

Review of Literature

Prior to a detailed discussion on how risk-taking behaviors may be controlled, it would be helpful to specifically determine what is meant by risk and risky behaviors. The prevalence of harmful adolescent behaviors in the United States are measured and reported by the Youth Risk Behavioral Surveillance System (YRBSS), which is administered by the Centers of Disease Control and Prevention, along with state and local governmental agencies (CDC, 2014). Health-risk behaviors are classified into six different categories: (a) behaviors that contribute to unintentional injuries and violence, (b) sexual behaviors that contribute to unintended pregnancy and sexually transmitted diseases, (c) alcohol and other drug use, (d) tobacco use, (e) unhealthy dietary behaviors, and (f) inadequate physical activity (CDC, 2012). While all of these patterns of behavior are tied to risk-taking activities that could affect the health and safety of participants, only the first three describe the kinds of behaviors that involve impulsive and non-habitual categories of behavior. In other words, the curriculum that will be introduced in this paper is not intended to address longer term, habitual problems. Thus the training that will be provided to students taking this curriculum will be limited to addressing risky behaviors that are short-term and that have effects that are immediately experienced, or, in the case of sexual behaviors, within a relatively short period of time after the behavior has taken place. Examples of activities that could be used in this study include driving related behaviors such as texting or speeding, alcohol related events such as impaired driving or binge drinking, physical activities such as "porch diving" or using a bike without a helmet, and other similar activities.

Theoretical Perspectives

Prior to considering strategies for remediating the heightened level of adolescent risk taking behaviors, a discussion of the theoretical perspectives related to their etiology in adolescence is warranted. Most contemporary theories ascribe the roots of risky behavior in terms of two different general perspectives. Biological or cognitive developmental theories of risky behavior consider changes in the structure and networks of the human brain throughout the adolescent years. Alternatively, socially based or relational based theories consider how adolescents relate to others in their environment in explaining the tendency to engage in risky behaviors.

Developmental and Cognitive Changes

Until recently, it was widely thought that teens engaged in emotionally thrilling, yet potentially harmful, and even dangerous, activities because they employed a faulty belief system where they believed that they would not be harmed or affected by their risky actions. This subjective cognitive process was encapsulated in the individual's naïve belief that he or she was somehow immune to the harmful effects of risky behavior: "I know this is dangerous, but nothing will happen to me". The so-called "myth of invulnerability" has largely been disproven, however; in numerous self-report surveys, teens report they are fully capable of recognizing that they are engaging in dangerous activities, and acknowledge not only the potential harm that they may experience, but the probability of getting hurt as well (Steinberg, 2007). In spite of this knowledge, however, adolescents continue to participate in high-risk behaviors.

Other theories have postulated that providing teens with more information regarding different risky behaviors will reduce the frequency in which adolescents participate in them. In other words, an increased level of openness and communication about the consequences of risky

behaviors has been previously employed in an attempt to reduce these behaviors. Data on the issue has shown that public education about risky behaviors can help adolescents be more aware of the risks they take. Yet in spite of this knowledge, adolescents continue to take higher levels of risk than are found in either childhood or adulthood; it would thus seem that awareness of risk doesn't reliably translate to the expected reduction in potentially harmful behaviors (Steinberg, 2004).

It is clear that adolescents' embracing of risky and harmful behaviors is not the result of faulty belief systems regarding either the nature or impact of these behaviors. What processes, then, are influencing potentially self-destructive behavior throughout this stage of life? The most current research into this question indicates that throughout the course of adolescence the human brain experiences powerful qualitative changes that influence how the individual perceives risk and that fluctuate based on the emotional context in which decisions are made (Steinberg, 2007). Contemporary research into neural mapping and development demonstrates a difference in developmental rates between limbic networks of the brain, which are associated with emotional processing, and the prefrontal cortex, which regulates both decision making processes and impulse control (Blakemore & Robbins, 2012). Specifically, the limbic regions of the brain are considered to have reached full development by the time the individual reaches adolescence, while the pre-frontal cortex is still establishing developmental connections through myelination and synaptic pruning during this period of development (Steinberg, 2007).

Giedd (2009) elaborates on the changes taking place in the human brain during adolescence by explaining three processes that simultaneously affect neural development and maturation: (1) a reduction of gray matter, or the number and size of cells in the brain through the neural pruning process as the individual matures into adolescence, (2) an increase in white matter as neural

connections increase and myelination is enhanced, and (3) changes in the dynamic relationship between the limbic system networks, which are the source of emotions and the frontal region of the brain, which as the executive functioning region of the brain is responsible for regulating emotion.

In emotionally neutral situations, this neurological mapping is not readily apparent; adolescents consistently demonstrate the same competence to solve problems, evaluate situations, and to make logical choices as adults (van Duijvenvoorde, Jansen, Visser, & Huizeng, 2010). This competence is largely impaired, however, when the individual must make decisions in an emotionally charged situation. The aforementioned systems and processes, in these circumstances, may result in a disconnect between the emotions of the limbic region from the executive functioning of the prefrontal cortex. The result may be seen as hasty and impulsive, rather than rational decisions that fully analyze the inherently harmful aspects of risky behaviors. In other words, adolescents are compromised in their abilities to rationally make sound decisions in the emotionally "hot" contexts that they frequently experience in their environments (Blakemore & Robbins, 2012). Impulsive decisions to choose courses of action that are more emotionally stimulating or thrilling can have both short and long-term detrimental or even dangerous consequences (Wolff & Crockett, 2011).

While the tumultuous changes that are taking place within the adolescent brain may show why risk-taking behaviors increase during these years, this by no means indicates that impulsivity and risk-taking behaviors are a foregone conclusion. To some extent, the neural changes that take place within the brain are universally experienced as part of the normal maturation process. The extent to which these changes have an effect on the individual, however, are in turn influenced by other factors, such as genetic predispositions toward mental illness or

how environmental factors such as caretaking adults may have influenced the individual. For example, the establishment of long-term goal setting strategies has been shown to reduce adolescents' decisions to engage in risky behaviors. Research has shown that adolescents may be less likely to engage in risky behaviors with potentially long term detrimental effects if they have established long term personal plans and goals for themselves, and if they perceive the risky behaviors as preventing the realization of those goals. This is especially true if they can perceive these goals as being realistically achievable. For example, students who have a more realistic view of being able to afford college tuition are less likely to engage in risky behaviors that could jeopardize future college attendance, such as alcohol or drug use or unprotected sex (Cowan, 2006). This implies that government efforts to reduce the cost of college attendance may have a side benefit of reducing teenaged delinquency problems. Put differently. If a young man or woman can reasonably expect to have an opportunity to have a chance at a lifestyle that they consider to be successful, he or she would be more willing to consider potentially risky courses of action. Of course, the practical and economic applications of providing kids from different cultural and socioeconomic backgrounds the same opportunities across the board would be extremely difficult, if not impossible, to implement. This is especially true when considering the limited resources that are provided to government programs in the current political environment. Still, the findings of this line of research do indicate that more data and research into the communal prevention of adolescent risk-taking behaviors are clearly warranted.

Social and relational theories

In addition to being a developmental period that is characterized by numerous changes in neural communications and networks, adolescence is also a life stage characterized by profound changes in the way the individual interacts with others in his or her family, academic, and social

environments. This is a period of time where young men and women are beginning to attain higher levels of independence and responsibility. Frequently, this means that adolescents find themselves in situations without the direct supervision of a parent, teacher or other adult authority figure. Conversely, adolescents often find themselves in the presence of other peers, as the peer group begins to form the dominant social context for the individual adolescent girl or boy. Therefore, it is prudent to consider the impact that both peer and parental relationships will have on the tendency for adolescents to engage in risk-taking activities.

It would be extremely difficult to underestimate the importance of the role that peers play in the lives and risk-taking activities of adolescents. Development throughout adolescence entails a gradual process where young men and women prepare for their adult roles. As such, the predominance of their activities outside of the home – work, school, leisure time, sports and clubs – are spent with their friends and peers. Because peers are experiencing similar developments in their biological and neurological developments, in the absence of adult supervision, the impact of emotionally charged situations that elicit risk-taking behavior is increased exponentially when peers are together, particularly when the peer group espouses values and activities that are inherently risky or deviant (Wolff & Crockett, 2011). This increased tendency to embrace high risk behaviors in the presence of peers has been demonstrated in laboratory simulated video games (Gardner & Steinberg, 2005), simulated driving tasks (Chein, Albert, O'Brien, Uckert, & Steinberg, 2010) and adolescents' self-reports of their risky behaviors (Michael & Ben-Zur, 2007; Wolff & Crockett, 2011). In this respect, peers function as agents in encouraging risk-taking behaviors, and as social catalysts in their reinforcement. Further evidence of this is demonstrated in research that shows a correlation between simulated risk-

taking activities in the presence of peers with MRI activity in the brain areas that are associated with rewards (Chein, et al., 2010).

It would be reasonable to state that the influence of parents in the adolescent years is diminished in comparison to their influence in childhood. This does not imply, however, that parents' roles become insignificant; although they may not state it openly, teens continue to be influenced by their parents throughout the adolescent years, and parenting styles have been demonstrated to have an effect on the level to which their adolescent children take risks. Specifically, an open and nurturing parental style has been shown to effectively reduce the prevalence of high-risk behaviors in adolescence. "Good parenting, which includes frequent communication, regular daily involvement, monitoring and related skills, and instilling appropriate coping skills, may assist the adolescent in avoiding involvement in deviant behavior and enable him/her to deal with frustration, control anger, and apply other self-management strategies" (Wolff & Crockett, 2011). Conversely, a detached and unsupportive parenting style has been correlated with an increased tendency to engage in risky behaviors (Wolff & Crockett, 2011).

In addition to parenting style, levels of parental control are correlated with adolescent risk-taking. Risk-taking behaviors in adolescents are positively correlated with parents who allow their children too much autonomy in the decisions they make in their day to day lives, such as the clothes they regularly wear or the friends they associate with. However, excessive parental control that allows a very limited amount of autonomy also is correlated with an increased tendency to participate in risk-taking activities. It would therefore seem that the most effective level of parental control incorporates a strategy that allows adolescents to make some

independent decisions and choices in their lives, but that continue to monitor their behaviors with realistic expectations for appropriate behavior (Wolff & Crockett, 2011).

Finally, it appears that both parents and other adults in an adolescents' communities (i.e. teachers, community leaders, or spiritual leaders) can play a significant role in helping teens think through their decision making processes and make appropriate behaviors. For example, adolescents from military families experience statistically lower rates of engaging in deviant behavioral patterns (Hutchinson, 2006). Military dependent children often reside on a military post, where common communal norms, values and expectations are shared by their peers as well as other families in the community. The common bond of relating to peers who understand a common culture may provide both parents and peers with expectations that reinforce familial expectations in a way that might not be seen in a community where families are more culturally isolated from each other. Children and adolescents from military families have also grown up in environments where their resiliency is enhanced, as they have had to experience parental deployments or frequency of moves. The fact that risk-taking behaviors are less commonly found among adolescent aged military dependents suggests that there may be a practical way to reduce these behaviors among adolescents who come from diverse backgrounds and communities.

Although there are deviations among different adolescent populations in the extent to which they engage in risk-taking behaviors, national statistics demonstrate that adolescents continue to engage in these behaviors in proportions greater than among adult populations (Steinberg, 2007). The etiology of this tendency has been the focus of much of the contemporary research, and has already been discussed in this forum. The attempt to address this problem has, however, received very little consideration in the contemporary body or available research. For this reason, it is important that researchers in the social sciences begin to incorporate what we

currently understand about neural processing in the adolescent brain into strategies to control and reduce risk for adolescents in their communities. Put another way, the ability of adolescents to make rational choices in emotionally "cold" or neutral situations seems to indicate that a decision making model that is completed in these contexts may help to reduce the risky behaviors that are made in emotionally charged or "hot" situations. While suggestions to develop such a model have been made (Wolff & Crockett, 2011), research that actually measures the utility of such strategies remains largely unexplored. It is in this present forum, therefore, that such a model will be proposed and investigated.

In considering methods for training students to anticipate and adequately prepare for risky behaviors, several factors should be taken into consideration: (a) risk mitigation tools should employ deliberate and rational decision making strategies that can easily be comprehended by the individual student (Wolff & Crockett, 2011), (b) risk mitigation tools should be easily accessible and understandable, as should the training that is required to use those tools, (c) risk mitigation tools must be immediately available (i.e. portable) to users prior to encountering emotionally charged or "hot" situations, (d) risk mitigation procedures must be simple and quick so they do not require extensive time or effort, and (e) risk mitigation processes should be taught not only to individual students, but to peers as well, in order to fully maximize the potential for peer influences to act in a constructive way that encourages careful consideration rather than impulsive thinking.

Often, advances in counseling strategies come from applying techniques that have been employed in unrelated fields to counseling paradigms. One of the tools designed to reduce operational and personal risk in the United States Army is the risk assessment matrix and composite risk management system (US Army, 2006). The overall composite risk management

process is used for planning large scale military operations. It is a comprehensive and in-depth system that considers the impact of numerous risk factors that could adversely affect military operations. It would be unreasonable and impractical to for individual students to learn such a complex procedure. The basic risk assessment and decision making process, however, is a skill that is required training for soldiers at every level of responsibility. As such, it could easily be modified to be taught to high school students or even middle school students. The risk assessment process in its simplest form is completed on a portable and erasable laminated card and consists of the following five steps: (a) identify hazards, (b) assess hazards to determine initial risk using a risk assessment matrix, (c) develop controls, and reassess anticipated risks, (d) implement controls, and (e) supervise and evaluate as situations evolve (US Army, 2006).

Given the current body of research pertaining to the prevalence of risk-taking behaviors in adolescence, a version of this risk assessment procedure that is modified for an adolescent population may be useful in teaching young men and women how to make decisions that are safer for them as they engage in their planned activities. Specifically, it is recommended that training in risk assessment procedures be provided as part of a high school curriculum for adolescent aged drivers. Examples of curricula where this training would be appropriate would be in high school health, psychology, social studies, or biology classes. As part of the required curriculum, students could be trained on how to complete the risk assessment process and in the implementation of controls to reduce driving risks. This would be accomplished by using adolescents' abilities to assess pre-frontal cortex based cognitive problems in an emotionally neutral or "cold" context to their full advantage. It is proposed that the planned resolution of high risk behaviors in a cold context (prior to actually driving) will in turn spur the reduction of these

behaviors in an emotionally charged, or "hot", context (i.e. driving with peers or with a cellular phone).

In order to assure that this curriculum remains relevant to students throughout their development through adolescence, it is recommended that training in these techniques for risk awareness and prevention should be a required part of a health class curriculum. As part of this training, students should learn about how their brain development is related to their propensity to take higher risks. Statistics regarding how adolescents are affected by accidents, to include fatalities, injuries, and economic costs should be incorporated into this training. Training should include a through explanation of the risk assessment process, and the completion of risk cards for several situations that might be ordinarily encountered in the normal day to day events of adolescents in the local community where the curriculum is taught. Examples of these events would be both local and long distance driving in different anticipated weather conditions, social events or parties that may include alcohol or other intoxicants, and activities that may be risky such as skiing or hunting. Ideally, it is recommended that some of these cards be completed with classroom stimuli that resemble an emotionally charged or "hot" situation. For example, students may be asked to write about a scenario that may take place while loud music is played, or after seeing an emotionally charged short movie. Experiencing high levels of emotion while in a controlled environment may be beneficial in familiarizing students to be aware of similar situations when controls are not available and impulsive decisions may be made. Finally, it is recommended that this curriculum be provided not only by relevant educators, but with the assistance and cooperation of school counselors who should be prepared to speak with students individually.

Discussion

Research pertaining to risk-taking behaviors in adolescence has become, as mentioned before, a relatively recent topic of consideration. The function of the present research proposal is to address several shortcomings of the existing body of research. First, much of the existing literature has addressed the nature of risk-taking behaviors in an artificial or laboratory setting, as in a driving simulation. Chein et al. (2010) employed such a model in the analysis of risk taking behaviors of adolescents in the presence or absence of peers. While laboratory based simulations are valuable in the extent to which they can explain the nature of phenomena such as high risk behaviors, their external validity is compromised in that the findings are restricted to a laboratory setting. Furthermore, while such research designs are valuable in identifying the etiology of risk taking behaviors, they are not designed to identify how to address those behaviors in order to reduce the frequency of their occurrence.

A second body of research into risk-taking behaviors employs the use of self-reporting, often using the retroactive reports of adolescents in describing the context and nature of their own risky behaviors. For example, Wolff and Crockett (2010) used a self-report technique to measure the nature of risky behaviors for adolescents and the extent to which they engage in them. It should be noted that the nature of such research designs are largely descriptive and correlational – they are effective in identifying the factors that are related to risk-taking behaviors, but again do not identify practical solutions to reducing or eliminating these behaviors.

The third body of the existing research is also largely descriptive in nature, but does provide a valuable tool that may play a key role in determining a practical approach to reducing the frequency of risky behaviors among adolescents. The evidence indicates that the link

between neural development and risk-taking behavior (Steinberg, 2007) and the tendency for adolescents to make impulsive and risky decisions in emotionally charged contexts (van Duijvenvoorde et al., 2010) are related phenomena that provide an explanatory model for adolescent risk-taking. Taking this model into consideration, several approaches may be considered to address how risk-taking behaviors could potentially be controlled or reduced.

Steinberg (2007) calls for an approach that limits the availability of controlled substances such as tobacco and alcohol by significantly raising their prices, raising the age at which individuals obtain their drivers licenses, and expanding teens' access to mental health and contraceptive services. The intended purpose of this approach is to delay access to materials and activities associated with risk-taking activities until full myelination and neural networking in the prefrontal regions have taken place and the individual is better equipped to make sound decisions related to taking risks. While any effort to help resolve the societal harm caused by teen risk-taking is laudable, these types of solutions may not be the most effective or practical means of reducing risky behaviors for several reasons. First, the solutions proposed by Steinberg are impractical; many adolescents have taken on the responsibility of working at a job or have chosen to participate in extracurricular activities in their schools and communities, and rely on their cars to do so. Raising the age of driving, particularly in rural societies with limited public transportation, would prevent these youths from carrying on these kinds of activities and could even have adverse economic impacts on families that rely on their income. Furthermore, the legislative requirements to pass such an agenda would be impractical, if not impossible to enact when considering the practical strain these laws would place on the families of adolescents.

Steinberg's approach falls short for a second reason –the historical precedence of such approaches shows that they have been consistently been shown to fall short of their stated goals.

Whether considering the impact of prohibition or of the war on drugs, the attempt to ban or limit access to desired substances or activities has not been effective, and has sometimes even had the opposite effect, resulting in an increase in the participation of these kinds of activities.

The nature of the risk assessment process, as described in this forum, is potentially advantageous in that it enhances the ability of adolescents to make rational decisions in the emotionally cool context that immediately precedes other contexts that may be more emotionally charged, such as of driving in the presence of friends, while listening to music, or while carrying a cell phone. Without awareness and practice, all of these distractions could have potentially catastrophic consequences. The use of this simple risk assessment process could easily be incorporated by school counselors or administrators into the curriculum of a traditional high school. If a pilot study demonstrates that this technique is effective, a longitudinal design that codifies training in risk assessment for students could be made a requirement for on campus driving or parking privileges.

It is important to note that the use of the risk assessment card is only as effective as students are willing to use them. It is also important to recognize that there may be some activities that are indeed risky, but may be sensitive subjects to students. As such, educators and caretakers cannot expect all students to be completely forthright about the activities they participate in. It may be impractical, and perhaps socially embarrassing, to suggest to a teen that they honestly complete a risk assessment in the classroom some sensitive subjects. For example, would such an approach be feasible to aid in the reduction of sexual activity in adolescence, particularly unprotected sex? One of the advantages of this approach as it relates specifically to driving is the convenience of keeping a card and a journal in the car, thus making them more

accessible and practical for use in the effort to reduce risk-taking behaviors. Bringing a journal or card to a high school party or on a date is another matter altogether.

It may be shown in future research, however, that the benefits experienced by the use of a risk assessment process may be experienced in some of these other contexts. If this were shown to be the case, it could potentially be indicative of the benefits of this training crossing over into unrelated areas of a young man or woman's life, where they actually employed the processes associated with risk assessment in driving in considering risks in other aspects of their lives. If this were shown to be the case, this would be indicative of a more global impact of this training. Clearly this is a matter for further investigation in future research.

Because this is a relatively new means of addressing risk-taking behaviors in adolescence, it is clear that further research is warranted. Factors that may be considered in future research are the differences of effectiveness of risk-assessment procedures for male and female drivers, or for different cultural, economic or ethnic groups. Other factors that could be considered in future research are the effectiveness of such procedures for longer periods of driving. In other words, it may be the case that the risk assessment process proves to be effective in risk-taking behaviors when a teen is driving to school or to work from their home, but proves ineffective when driving for longer than an hour. In spite of all these considerations, the prospect of seeing how this model affects the level of risky behaviors and related car accidents or injuries may prove to be an important method to address the societal costs of such behaviors in the future.

It is clear that there are many possibilities for the practical application of the subject matter that has been discussed in this forum. To be sure, training of this kind cannot realistically be expected to eliminate tragic consequences altogether. The central hope of this forum, however, is

that the realistic teaching of a deliberate and proactive approach to the developmental phenomena that compromises deliberate decision making may compensate for the way that adolescents react in unpredictable and emotional situations. As a result, it is hoped that many needless accidents can be avoided.

References

Blakemore is S. & Robbins, T. (2012). Decision making in the adolescent brain. *Nature Neuroscience, 15(9,)* 1184-1191.

Centers for Disease Control and Prevention (2015). Injury prevention and control: Motor vehicle safety. Retrieved from: http://www.cdc.gov/MotorVehicleSafety/Teen_Drivers/teendrivers_factsheet.html

Centers for Disease Control and Prevention (2015). Ten leading causes of death and injury. Retrieved from: http://www.cdc.gov/injury/wisqars/leadingcauses.html

Centers for Disease Control and Prevention (2014). Youth risk behavior surveillance: United States, 2013. Retrieved from: http://www.cdc.gov/mmwr/pdf/ss/ss6304.pdf

Chein, J., Albert, D., O'Brien, L., Uckert, K., & Steinberg, L. (2010). Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental Science (2010),* F1-F10.

Cowan, B. (2011). Forward-thinking teens: the effects of college costs on adolescent risky behavior. *Economics of education review.* (30), 813-825.

Garnder, M. & Steinberg, L. (2005). Peer influence on risk-taking, risk preference, and risk decision-making in adolescence and adulthood: an experimental study. *Developmental Psychology, 41,* 625-635.

Giedd, J. (2009). The teen brain: primed to learn, primed to take risks. *Cerebrum.* Retrieved from http://www.dana.org/Cerebrum/2009/The_Teen_Brain__Primed_to_Learn,_Primed_to_Take_Risks/

Hutchinson, J. (2006). Evaluating risk-taking behaviors of youth in military families. *Journal of adolescent health:* 39, 927-928.

Michael, K. & Ben-Zur, H. (2007). Risk-taking among adolescents: Associations with social and affective factors. *Journal of adolescence, 30,* 17-31.

Miniño, A. (2010). Mortality among teenagers aged 12-19 years: United States, 1999-2006. *NCHS Data Brief (37)*, U.S. Department of Health and Human Services, Centers for Disease Control & Prevention.

Steinberg, L. (2004). Risk-taking in adolescence: What changes, and why? *Annals of the new York Academy of Science, 1021,* 51-58.

Steinberg, L. (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current directions in psychological science, 16(2),* 55-59.

US Army (2006). Field Manual 5-19, Composite risk management. Department of the Army, Washington, DC.

van Duijvenvoorde, A., Jansen, B. , Visser, I, & Huizenga, H. (2010). Affective and cognitive decision making in adolescents. *Developmental Neuropsychology, 35*(5), 539–554.

Wolf, J., & Crockett, L.. (2011). The role of deliberative decision making, parenting and friends in adolescent risk behaviors. *Journal of youth and adolescence:* 40, 1607-1622.

Appendix A:

Figure 1. Risk Assessment matrix

Risk Assessment Matrix
based on FM 5-19

RISK ASSESSMENT MATRIX						
	Probability					
Severity		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	E	E	H	H	M
Critical	II	E	H	H	M	L
Marginal	III	H	M	M	L	L
Negligible	IV	M	L	L	L	L
E-Extremely High		H-High		M-Moderate		L-Low

Appendix B:

Definition of terms:

Probability:

- Frequent – Occurs very often, known to happen regularly. In illustration, given 500 or so exposures to the hazard, expect that it will definitely happen to someone.

- Likely – Occurs several times, a common occurrence. In illustration, given 1000 or so exposures without proper controls, it will occur at some point.

- Occasional – Occurs sporadically, but is not uncommon.

- Seldom – Remotely possible, could occur at some time. Usually several things must go wrong for it to happen.

- Unlikely – Can assume will not occur, but not impossible.

Severity:

Catastrophic –.

- Death or permanent total disability.
- Total loss of equipment.

Critical –

- Permanent partial disability or temporary total disability exceeding three months' time.
- Extensive major damage to equipment or systems.
- Significant collateral damage.

Marginal –

- Minor damage to property or the environment.
- Lost days due to injury or illness not exceeding three months.

Negligible –

- Little or no adverse impact.
- First aid or minor medical treatment.
- Slight equipment or system damage, but fully functional or serviceable.

Appendix C:

Risk Assessment Worksheet:

A. Mission or Task:	B. Date/Time Group Begin: End:	C. Date Prepared:
D. Prepared By: (Rank, Last Name, Duty Position)		

E. Task:	F. Identify Hazards:	G. Assess Hazards:	H. Develop Controls:	I. Determine Residual Risk:	J. Implement Controls ("How To"):

K. Determine overall mission/task risk level after controls are implemented (circle

LOW (L) MODERATE (M) HIGH (H) EXTREMELY HIGH (E)